

C 16. (Amended) A method for depositing wear-resistant coatings on metal surfaces of machine components and articles, said method comprising the following steps:

- (i) providing an ion-plasma deposition chamber;
- (ii) locating as an anode said machine components or articles being treated inside said ion-plasma deposition chamber;
- (iii) locating in said chamber cathodes made from the Group IVA-VIA metals and/or alloys thereof;
- (iv) establishing in said chamber a gas atmosphere wherein the gas is selected from the group consisting of inert or non-inert gases and mixtures thereof;
- (v) effecting, whenever necessary, ion cleaning of surfaces of said machine components or articles;
- (vi) effecting selective ion-plasma deposition of layers of a coating, wherein at least one layer (a) consists of said metals, mixtures thereof or substitution alloys, a second layer (b) consists of solutions of nonmetallic atoms of nitrogen, carbon, and boron in said metals, and a third layer (c) consists of chemical compounds of said metals with nonmetals in the form of nitrides, carbides, borides and mixtures thereof;
- (vii) subjecting one or more of said layers to treatments by implanting therein non-metallic ions;
- (viii) cooling and unloading said machine components or articles from said chamber.

17. (Amended) A method as claimed in claim 16, characterized in that after having been cooled and unloaded said machine components or articles are subjected to vibromechanical treatment with pellets.

19. (Amended) A method as defined in claim 16, wherein said cathodes are titanium alloys which after deposition form a composition similar to the base material of a machine component or article.

20. (Amended) A method as defined in claim 16, wherein there are from 3-500 layers, and said layers (a), (b), (c) alternate successively.

21. (Amended) A method as defined in claim 19, wherein the layers (a), (b), (c) are in a thickness ratio of 1.0:2.0:2.5.

22. (Amended) A method as defined in claim 16, further comprising the step of depositing a first layer consisting of scandium, yttrium or other rare earth metal having a thickness of 0.02 to 0.08 micron before step (vi).

23. (Amended) A method as defined in claim 16, wherein the gas atmosphere is nitrogen, acetylene, methane or diborane.

24. (Amended) A method as defined in claim 16, wherein said step of ion deposition is effected with ions of argon, or nitrogen, or carbon, or boron at an accelerating voltage of 10-50 kV, at a radiation dose of  $10^{14} - 10^{18}$  ion/sq.cm. and an energy of ions of  $5 \times 10^3 - 1 \times 10^5$  eV.

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C<sub>cor</sub> 25. (Amended) A method as defined in claim 16, wherein said ion-plasma deposition step (vi) comprises the steps of depositing:

(a) a scandium layer in an argon atmosphere;

(b) a titanium layer in an argon atmosphere;

(c) a layer comprising a solid solution of implanted nitrogen ions in titanium in an atmosphere comprising a mixture of nitrogen and argon;

(d) a layer comprising titanium nitride implanted with nitrogen ions in nitrogen atmosphere;

(e) a zirconium layer in argon atmosphere;

(f) a layer comprising a solid solution of implanted nitrogen ions in zirconium in an atmosphere comprising a mixture of nitrogen and argon;

(g) a layer comprising zirconium nitride implanted with nitrogen ions in nitrogen atmosphere; and

(h) the step of repeating said steps (b-g) in that order to provide a desired number of layers.

26. (Amended) A method as defined in claim 16, wherein said deposition step (vi) comprises depositing:

(a) a first layer comprising alloys of titanium and zirconium in an inert gas atmosphere;

(b) a layer comprising alloys of titanium and zirconium implanted with nitrogen atoms in an atmosphere of a mixture of said inert gas and nitrogen;

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Cons* (c) a layer comprising titanium and zirconium nitrides implanted with nitrogen ions in nitrogen atmosphere;

(d) repeating said steps (a) -(c) to provide a desired number of layers to form a multilayer coating; and

(e) implanting argon ions into the multilayer coating.

27. (Amended) A method as defined in claim 26, wherein said deposition step (vi) comprises depositing:

(a) a layer of titanium and zirconium alloys in an inert gas;

(b) alloys of titanium and zirconium with boron in a mixture of an inert gas with diborane;

(c) titanium and zirconium borides implanted with boron;

(d) repeating said steps (a)-(b) in that order to provide a desired number or layers to form a multilayer coating; and

(e) implanting argon ions in the multilayer coating.

28. (Amended) A coating of metal surfaces, comprising deposited on said surfaces by ion-plasma deposition process at